CLAIMS

What is claimed is:

1. A solar cell structure comprising:

a solar cell comprising two semiconductor layers in facing contact with each other, wherein the semiconductor layers comprise a semiconductor junction producing a voltage between the two semiconductor layers when illuminated; and

a shunt comprising a channel of an altered material

extending between and at least partially through the two semiconductor layers, and

having an asymmetric current-voltage characteristic of passing a small current when voltage-biased in a forward direction parallel to the channel, and passing a large current when voltage-biased in a reverse direction parallel to the channel and opposite to the forward direction.

2. The solar cell structure of claim 1, wherein the altered material is a proton-irradiated altered material.

3. The solar cell structure of claim 1, wherein the altered material is a doped altered material.

4. The solar cell structure of claim 1, wherein the solar cell comprises more than two semiconductor layers, and wherein the shunt extends between and at least partially through at least two of the semiconductor layers.

5. The solar cell structure of claim 1, wherein the solar cell comprises more than two semiconductor layers, and wherein the shunt extends between and at least partially through at least three of the semiconductor layers.

6. The solar cell structure of claim 1, wherein the shunt comprises a plurality of channels spaced apart from each other over a front-side surface of the

solar cell.

7. The solar cell structure of claim 1, wherein the solar cell structure comprises a plurality of electrically interconnected solar cells as recited in claim 1, with each solar cell having a shunt as recited in claim 1.

8. A method for fabricating a solar cell structure, comprising the steps of

depositing a solar cell comprising two semiconductor layers in facing contact with each other, wherein the semiconductor layers comprise a semiconductor junction producing a voltage between the two semiconductor layers when illuminated;

forming a shunt comprising a channel of an altered material

extending between and at least partially through the two semiconductor layers, and

having an asymmetric current-voltage characteristic of passing a small current when voltage-biased in a forward direction parallel to the channel, and passing a large current when voltage-biased in a reverse direction parallel to the channel and opposite to the forward direction.

9. The method of claim 8, wherein the step of depositing includes the step of

depositing more than two semiconductor layers, and the step of forming includes the step of

forming the shunt to extend between and at least partially through at least two of the semiconductor layers.

10. The method of claim 8, wherein the step of depositing includes the step of

depositing more than two semiconductor layers, and the step of forming includes the step of

forming the shunt to extend between and at least partially through at least

three of the semiconductor layers.

11. The method of claim 8, wherein the step of forming a shunt includes a step of

directing a proton beam into the semiconductor layers.

12. The method of claim 8, wherein the step of forming a shunt includes a step of

doping the channel.

13. The method of claim 8, wherein the step of forming a shunt includes steps of

doping the channel by ion implantation, and

annealing the channel.

14. The method of claim 8, wherein the step of forming includes a step of

forming a plurality of channels spaced apart from each other over a front-side surface of the solar cell.

15. The method of claim 8, including an additional step, to occur after the step of forming the shunt is complete, of

placing the solar cell structure into service.